CHAPTER 3

MAXIMIZATION OF STORAGE IN THE COLLECTION SYSTEM

As the second minimum control, maximum use of the collection system for storage means making relatively simple modifications to the CSS to enable the system itself to store wet weather flows until downstream sewers and treatment facilities can handle them. The municipality should evaluate more complex modifications (e.g., those requiring extensive construction) as part of the LTCP.

The first step is to identify possible locations where minor modifications can be made to the CSS to increase in-system storage. O&M personnel should be able to identify these sites; the concurrent effort to characterize the system as part of the LTCP should also help. Possible modifications should then be analyzed to ensure that they will not cause other problems such as street or basement flooding. Modifications should be implemented and efforts documented for the NPDES permitting authority.

3.1 Control Measures

This section briefly discusses simple measures that can be implemented to increase the storage capacity of a CSS, thus decreasing the magnitude, frequency, and duration of CSOs. A number of these measures can also be applied to implementation of other minimum controls. For example, inspection and maintenance activities that increase the use of the collection system will also reduce dry weather overflows and increase flows to the POTW.

- **Collection System Inspection**—This will enable identification of serious deficiencies that restrict the use of the system's available storage capacity. Deficiencies that can be corrected by proper maintenance or structural repairs, or by modifications that do not require comprehensive engineering design and facility construction, should be remedied as soon as possible. For example, O&M staff can remove accumulations of debris or sediment and replace sections of pipe that are obviously undersized in relation to upstream and downstream line sizes. In addition, inspection programs can identify malfunctioning regulators or broken regulator weirs for repair.

- **Tide Gate Maintenance and Repair**—Leaking tide gates can admit significant volumes of water into the conveyance system, thereby occupying system storage and conveyance capacity that would otherwise be available during wet weather periods. A tide gate inspection and maintenance program can use sensors placed inboard of the gate to detect tidal intrusions during dry weather periods and alert maintenance crews. The sensors can also be used to detect dry weather overflows, which are addressed under a different minimum control.

- **Adjustment of Regulator Settings**—Many regulating devices, with simple modifications, can be used to increase in-system storage of wet weather flows. In some cases, stop planks or brick/concrete weirs can be raised to increase in-system storage. In addition, interactive controls can be used to temporarily induce in-line storage of wet weather flows (e.g., a regulator setting can be manipulated automatically in response to depth or flow in an interceptor).

- **Retard Inflows**—By using special gratings or Hydrobrakes (or comparable commercial devices), O&M staff can modify catch basin inlets to restrict the rate at which surface runoff is permitted to enter the system. Slowing inflow will enable the CSS to transport more flow overall by spreading out the flow over time. Eliminating the direct connection of roof drains and sump pumps to the collection system is also possible where sufficient land area is available for drainage.

- **Localized Upstream Detention**—Using localized detention in appropriate upstream areas could provide effective short-term storage (e.g., upstream parking areas could be used for temporary storage of some storm water during storm events).

- **Upgrade/Adjustment of Pump Operations at Interceptor Lift Stations**—Increased pumping rates might be possible through repair, modification, or augmentation of lift stations. This would increase the available capacity in upstream portions of the system but would depend on the available hydraulic capacity of downstream portions of the collection system, as well as the processing capability of the POTW, to accept the increased flow rates.

- **Removal of Obstructions to Flow**—This can include maintenance activities to remove and prevent accumulations of debris and sediment that restrict flow. Where flow obstruction is caused by sediment accumulations in sections with low gradients, sewer flushing might be an effective control measure. When a section of the conveyance system routinely accumulates sediment deposits at a substantial rate, design and installation of a permanent flushing station or an in-line grit chamber might be the most cost-effective approach and should be considered as part of the LTCP.

3.2 Considerations

Maximizing the use of existing facilities is a cost-effective way to improve the level of CSO control without the difficulties associated with land acquisition, construction, and community impacts of some other control methods. Appropriate techniques, costs, and the degree of improvement will vary substantially with system characteristics. In cases where collection system maintenance has been neglected, where there are blockages or other hydraulic bottlenecks, or where excess capacity is available, corrective action may provide significant improvements in CSO control.

Risk of upstream (street, basement) flooding goes up with increased use of the collection system for storage. The application of measures to expand storage capacity in the collection system will increase O&M requirements, and for some techniques (e.g., check dams with telemetering and real-time control) the increase may be significant. Storing wet weather flows within the collection system is likely to increase deposition through settling of suspended matter. Additional O&M may be necessary if subsequent flows do not resuspend and remove sedimentation.

Topography and other site conditions will also limit the volume of combined sewage that can be stored in the system regardless of whether simple or more elaborate modifications are undertaken. For example, where the entire system is relatively flat, wet weather flows might back up relatively far into the head of the system. In addition, such a system would normally be designed with relatively large combined sewers to convey runoff away from city streets. As a result, an area with relatively flat topography can expect greater storage capacity in the collection system. An area with relatively steep slopes, on the other hand, would flood downstream areas before much of the upstream storage capacity could be used and, thus, would have limited storage capacity.

3.3 Example of Implementation

The city of Detroit installed inflatable dams in two long, large-diameter lines that extend from the collection system to the shoreline discharge point. The system layout prevented any

risk of upstream adverse effects, and installation was relatively straightforward and inexpensive. Detailed monitoring data are not available to quantify the benefits, but these devices are often effective in completely containing overflows from smaller storms and can reduce the number of overflows. Maintenance is minimal because contained flows drain back into the collection system following the storm, and no real-time operation of the devices is necessary. The dams simply provide more effective use of existing excess capacity within the system.

3.4 Documentation

The following elements are examples of documentation that could be submitted to the NPDES permitting authority to demonstrate the municipality's efforts to implement this control, as well as the control's effectiveness in reducing CSO impacts:

- An analysis/study of alternatives to maximize collection system storage
- A description of procedures in place for maximizing collection system storage
- A schedule for implementation of minor construction associated with maximization of collection system storage
- Documentation of actions taken to maximize storage
- Identification of any additional potential measures to increase storage in the existing collection system, but which require further analysis, and which will be evaluated in hydraulic studies conducted as part of the LTCP.

CHAPTER 4

REVIEW AND MODIFICATION OF PRETREATMENT REQUIREMENTS

Under the third minimum control, the municipality should determine whether nondomestic sources are contributing to CSO impacts and, if so, investigate ways to control them. The objective of this control is to minimize the impacts of discharges into CSSs from nondomestic sources (i.e., industrial and commercial sources, such as restaurants and gas stations) during wet weather events, and to minimize CSO occurrences by modifying inspection, reporting, and oversight procedures within the approved pretreatment program. Once implemented, this minimum control should not require additional effort unless CSS characterization and modeling indicate that a pollutant from a nondomestic source is causing a specific health, water quality, or environmental problem.

This review can be conducted as part of a municipality's pretreatment program. If a community does not have an approved local pretreatment program, it should still determine whether nondomestic sources are contributing to CSO impacts. A municipality with no known nondomestic sources should implement this minimum control by periodically reevaluating whether it has nondomestic discharges. All municipalities should provide documentation to the NPDES permitting authority on the assessment of nondomestic source impacts and on efforts to mitigate any impacts from such sources, as appropriate.

4.1 Control Measures

The following steps are appropriate for municipalities with local pretreatment programs as well as municipalities that receive nondomestic discharges but are not required to develop a formal pretreatment program.

4.1.1 Inventory Nondomestic Discharges to the Combined Sewer System

The municipality should first prepare an inventory of all nondomestic discharges to the collection system. The inventory should include information on the volume of flow and the pollutant types and concentrations in the discharge. By identifying the locations where

nondomestic discharges enter the CSS on a map of the system, the potential impact of the nondomestic discharge on the CSO will be more clear. Municipalities with existing pretreatment programs should have all of this information readily available because as part of approved pretreatment programs, they are required to identify and locate all possible industrial users (in accordance with 40 CFR 403.8(f)(2)(i)).

If the number of nondomestic users is large enough to preclude review of all facilities, the municipality should focus on the facilities with the greatest potential impact with regard to CSOs. This determination can be based on the size of the discharge, the concentration of pollutants that might be contributing to water quality criteria exceedances, or the proximity of the nondomestic user's discharge point to the CSO outfall.

4.1.2 Assess the Impact of Nondomestic Discharges on CSOs

The second measure is to assess the impact of nondomestic discharges on CSOs by comparing the total quantity of nondomestic flow to the total flow from all sources. When nondomestic facilities are concentrated in certain areas, the comparison should be based on flows from areas contributing to specific overflow points.

When appropriate, this assessment can also include the identification of nondomestic sources that are significant contributors of specific pollutants implicated in water quality problems. A more detailed assessment may be appropriate for cases in which nondomestic discharges contribute significantly to discharge volume and pollutant loading.

4.1.3 Evaluate Feasible Modifications

The third measure is to evaluate feasible modifications to the approved pretreatment program if the assessment indicates that nondomestic sources might contribute significantly to CSOs. Both the feasibility and the effectiveness of modifications are site-specific. The prohibition of batch discharges or a requirement for some form of detention to prevent discharges during wet weather events should be considered. Once such controls are in place, a procedure for scheduling releases might be necessary to avoid post-event overflows. If such

procedures are necessary, scheduled releases can be included in the semi-annual monitoring reports of significant industrial users and the need for industrial slug discharge control plans required in 40 CFR 403.8(f)(2)(v).

All POTWs with approved pretreatment programs are required to notify and obtain approval from the approval authority for all substantial pretreatment program modifications. Substantial modifications include changes to legal authorities, local limits (if made less stringent), and control mechanisms. In addition, POTWs with approved pretreatment programs must notify the approval authority of any nonsubstantial pretreatment program modification. Section 403.18 of the General Pretreatment Regulations contains more information on the requirements for pretreatment program modifications.

4.2 Performance and Cost

The degree to which pretreatment program modifications can reduce CSOs will be highly variable and site-specific. The costs for conducting an inventory of nondomestic sources and reviewing existing pretreatment program requirements are expected to be nominal because most of the required information is readily available. The affected nondomestic dischargers will incur most of the costs for implementing modified requirements. Where delayed-release volume control is employed, however, regulating and inspecting release schedules will add to the municipality's O&M responsibilities.

4.3 Considerations

Industrial and commercial sites in CSO areas might have limited space available for temporary on-site storage of process wastewaters. Such situations might warrant development of appropriate release schedules and operational controls.

Where the relative contribution of nondomestic flow to the total dry weather flow is small, or where the fraction of the CSS service area dedicated to nondomestic use is small, the effect of increasing pollutant control might be insignificant. When nondomestic users contribute

a problem pollutant in a substantial quantity and effective pretreatment modifications are feasible, modification of the pretreatment program might improve CSO control significantly.

4.4 Documentation of Actions Taken

The NPDES permitting authority will need documentation demonstrating diligent effort to evaluate this control. The NPDES permitting authority will also need a clear understanding of the planned modifications and expected pollution control benefits. The following list provides suggested documentation:

- If the municipality does not have any significant nondomestic dischargers or is not authorized to administer its own pretreatment program, it should provide information sufficient to substantiate this fact.
- If the municipality does not have any significant nondomestic dischargers and is authorized to administer its own pretreatment program, it should provide:
  - An inventory of nondomestic dischargers
  - An assessment of the impact of nondomestic discharges on CSOs and receiving waters
  - An assessment of the value and feasibility of modifications to existing pretreatment programs.
- If modification of the pretreatment program is appropriate, the municipality should provide the following information:
  - A description of the modification
  - A schedule for implementing the modifications, including amending sewer use ordinances, if needed
  - An estimate of the loading reduction expected from the modification in pounds of biochemical oxygen demand and suspended solids, or other pollutants of concern.
- If modifications to the pretreatment program are not proposed, the permittee should provide justification.